

Search history

Search pn=WO2015131328 (Results 1)

1:

Search [SP]: 1. a computing device comprising: one or more buffers configured to store video in a sequence and a video encoder or image encoder
2: configured to perform operations comprising: encoding the video in the sequence, including switching color spaces, color sampling rates and/or bit depths spatially and/or temporally between at least some units of the video within the sequence during the encoding, the color spaces including an rgb-type color space and a ycocg color space, wherein the encoder is configured to: for lossy coding, use color space conversion operations to switch between the rgb-type color space and the ycocg color space and for lossless coding, use invertible color space conversion operations and an increased intermediate bit depth to switch between the rgb-type color space and the ycocg color space and outputting encoded data in a bitstream, the encoded data including one or more signals indicating how the color spaces, the color sampling rates and/or the bit depths switch between the at least some units of the video within the sequence. 2.-4. (canceled) 5. the computing device of claim 1 wherein the units of the video are transform blocks of a given picture of the sequence. 6.-9. (canceled) 10. the computing device of claim 1 wherein the encoded data further includes information identifying or defining the color spaces. 11.-15. (canceled) 16. the computing device of claim 1 wherein different color components of a given unit of the units of the video have different bit depths. 17. the computing device of claim 1 wherein the one or more signals include a flag value for a given unit of the units of the video, the flag value indicating a selection between two options for the color spaces, and wherein the encoding includes entropy coding the flag value using context-adaptive binary arithmetic coding. 18.-29. (canceled) 30. the computing device of claim 1 wherein the encoding includes deblocking previously reconstructed content according to one or more rules. 31. the computing device of claim 30 wherein the deblocking includes adjusting strength of a deblocking filter depending on whether primary components of two adjacent blocks have non-zero residual values. 32.-34. (canceled) 35. the computing device of claim 17 wherein the flag value is signaled as part of a block syntax structure for the given unit when there are residual values for the given unit. 36. in a computing device with a video decoder or image decoder, a method comprising: receiving encoded data in a bitstream, the encoded data including one or more signals indicating how color spaces, color sampling rates and/or bit depths switch between at least some units of video within a sequence, the color spaces including an rgb-type color space and a ycocg color space, wherein the one or more signals include a flag value for a given unit of the units of the video, the flag value having been entropy coded using context-adaptive binary arithmetic coding, and wherein the flag value indicates a selection between the rgb-type color space and the ycocg color space for the given unit and decoding the encoded data, including entropy decoding the flag value and switching the color spaces, the color sampling rates and/or the bit depths spatially and/or temporally between the at least some units of the video within the sequence during the decoding. 37. the method of claim 36, at least some of the encoded data having been encoded with lossless coding that uses invertible color space conversion operations and an increased intermediate bit depth to switch between the rgb-type color space and the ycocg color space. 38. the method claim 36 wherein the units of the video are transform blocks of a given picture of the sequence. 39. the method of claim 36 wherein the encoded data further includes information identifying or defining the color spaces. 40. the method of claim 36 wherein different color components of the given unit have different bit depths. 41. the method of claim 36 wherein the decoding further includes deblocking previously reconstructed content according to one or more rules. 42. the method of claim 40 wherein the deblocking includes adjusting strength of a deblocking filter depending on whether primary components of two adjacent blocks have non-zero residual values. 43. the method of claim 36 wherein the flag value is signaled as part of a block syntax structure for the given unit when there are residual values for the given unit. 44. one or more computer-readable media storing computer-executable instructions for causing a computing device, when programmed thereby, to perform operations comprising: encoding video in a sequence, including switching color spaces, color sampling rates and/or bit depths spatially and/or temporally between at least some units of the video within the sequence during the encoding, the color spaces including an rgb-type color space and a ycocg color space, wherein the encoding includes: for lossy coding, using color space conversion operations to switch between the rgb-type color space and the ycocg color space and for lossless coding, using invertible color space conversion operations and an increased intermediate bit depth to switch between the rgb-type color space and the ycocg color space and outputting encoded data in a bitstream, the encoded data including one or more signals indicating how the color spaces, the color sampling rates and/or the bit depths switch between the at least some units of the video within the sequence. 45. the one or more computer-readable media of claim 44 wherein the one or more signals include a flag value for a given unit of the units of the video, the flag value indicating a selection between two options for the color spaces, and wherein the encoding includes entropy coding the flag value using context-adaptive binary arithmetic coding. 46. the one or more computer-readable media of claim 44 wherein the flag value is signaled as part of a block syntax structure for the given unit when there are residual values for the given unit. (Results 0)

Search [SP]: adaptive switching of color spaces, color sampling rates and/or bit depths innovations in adaptive encoding and decoding for units of a
3: video sequence can improve coding efficiency. for example, some of the innovations relate to encoding/decoding that includes adaptive switching of color spaces between units within a video sequence. other innovations relate encoding/decoding that includes adaptive switching of color sampling rates between units within a video sequence. still other innovations relate encoding/decoding that includes adaptive switching of bit depths between units within a video sequence. (Results 162)

Search [SP]: background [0001] engineers use compression (also called source coding or source encoding) to reduce the bit rate of digital video.
4: compression decreases the cost of storing and transmitting video information by converting the information into a lower bit rate form. decompression (also called decoding) reconstructs a version of the original information from the compressed form. a "codec" is an encoder/decoder system.[0002] over the last two decades, various video codec standards have been adopted, including the itu-t h.261, h.262 (mpeg-2 or iso/iec 13818-2), h.263 and h.264 (mpeg-4 avc or iso/iec 14496-10) standards, the mpeg-1 (iso/iec 11172-2) and mpeg-4 visual (iso/iec 14496-2) standards, and the smpte 421m (vc-1) standard. more recently, the h.265/hevc standard (itu-t h.265 or iso/iec 23008-2) has been approved. extensions to the h.265/hevc standard (e.g., for scalable video coding/decoding, for coding/decoding of video with higher fidelity in terms of sample bit depth or chroma sampling rate, for screen capture content, or for multi-view coding/decoding) are currently under development. a video codec standard typically defines options for the syntax of an encoded video bitstream, detailing parameters in the bitstream when particular features are used in encoding and decoding. in many cases, a video codec standard also provides details about the decoding operations a decoder should perform to achieve conforming results in decoding. aside from codec standards, various proprietary codec formats define other options for the syntax of an encoded video bitstream and corresponding decoding operations.[0003] a video source such as a camera, animation output, screen capture module, etc. typically provides video in a particular color space, with color components of the video sub-sampled according to a particular color sampling rate, and with sample values having a particular bit depth. in general, a color space (sometimes called a color model) is a model for representing colors as n values per physical position, for n>1, where each of the n values provides a color component value for that position. for example, in a yuv color space, a luma (or y) component value represents an approximate brightness at a position and multiple chroma (or u and v) component values represent color differences at the position. or, in an rgb color space, a red (r) component value represents a red intensity, a green (g) component value represents a green intensity, and a blue (b) component value represents a blue intensity at a position. historically, different color spaces have advantages for different applications such as display, printing, broadcasting and encoding/decoding. sample values can be converted between color spaces using color space transformation operations.[0004] color sampling rate (sometimes called chroma sampling rate) refers to the relative spatial resolution between color components. for example, for a color sampling rate of 4:4:4, information for secondary components (e.g., u and v components for yuv) has the same spatial resolution as information for a primary component (e.g., y component for yuv). for a color sampling rate of 4:2:2 or 4:2:0, information for secondary components is downsampled relative to information for the primary component. yuv 4:2:0 format is commonly used for encoding/decoding. as a design principle, the decision to use a yuv 4:2:0 format for encoding/decoding is premised on the understanding that, for most use cases, viewers do not notice many visual differences between video encoded/decoded in a yuv 4:2:0 format and video encoded/decoded in a yuv 4:4:4 format. the compression advantages for the yuv 4:2:0 format, which has fewer samples per frame, are therefore compelling. [0005] bit depth refers to the number of bits per sample value. common bit depths are 8 bits per sample, 10 bits per sample and 12 bits per sample. in general, having more bits per sample allows for more precise gradations of colors for video, but uses more storage for the video. having fewer bits per sample typically reduces bit rate at the cost of reduced quality.[0006] many commercially available video encoders and decoders support only a yuv 4:2:0 format. other commercially available encoders and decoders (e.g., for the h.264/avc standard or h.265/hevc standard) allow an encoder to specify a color space, color sampling rate and bit depth for a given sequence. the specified color space, color sampling rate and bit depth are used for the entire video sequence. these approaches do not provide sufficient flexibility for a general-purpose codec system that may process very different kinds of video content within a single video sequence. summary [0007] in summary, the detailed description presents innovations in the area of adaptive encoding and decoding. for example, some of the innovations relate to an encoder that switches color spaces between units within a video sequence during encoding, as well as a corresponding decoder. other innovations relate to an encoder that switches color sampling rates between units within a video sequence during encoding, as well as a corresponding decoder. still other innovations relate to an encoder that switches bit depths between units within a video sequence during encoding, as well as a corresponding decoder. these innovations can improve coding efficiency in many scenarios.[0008] according to a first aspect of the innovations described herein, an image or video encoder encodes video in a sequence. as

part of the encoding, the encoder switches color spaces, color sampling rates and/or bit depths spatially and/or temporally between at least some units (e.g., pictures of the sequence, slices of a given picture of the sequence, blocks of a given picture of the sequence) of the video within the sequence. the encoder outputs encoded data in a bitstream. the encoded data includes one or more signals indicating how the color spaces, the color sampling rates and/or the bit depths switch between the at least some units of the video within the sequence.[0009] a corresponding decoder receives encoded data in a bitstream. the encoded data includes one or more signals indicating how color spaces, color sampling rates and/or bit depths switch between at least some units (e.g., pictures of the sequence, slices of a given picture of the sequence, blocks of a given picture of the sequence) of video within a sequence. the decoder decodes the encoded data. as part of the decoding, the decoder switches the color spaces, the color sampling rates and/or the bit depths spatially and/or temporally between the at least some units of the video within the sequence.[0010] for example, during encoding or decoding, the switching includes changing between two of the color spaces using color space transformation operations. for color space transformation operations, the color spaces can include at least one yuv-type color space and at least one rgb-type color space.[0011] or, as another example, during encoding or decoding, the switching includes changing between two of the color spaces using color space reordering operations. for color space reordering operations, the color spaces can include multiple rgb-type color spaces.[0012] or, as another example, during encoding or decoding, the switching includes changing between two of the color sampling rates. the color sampling rates can include two or more of 4:4:4, 4:2:2, 4:2:0 and 4:0:0.[0013] or, as another example, during encoding or decoding, the switching includes changing between two of the bit depths. the bit depths can include two or more of 12 bits per sample, 10 bits per sample and 8 bits per sample. also, different color components of a given unit of the video can have different bit depths.[0014] syntax and semantics for the signal(s) that indicate how color spaces, color sampling rates and/or bit depths switch depend on implementation. for example, the signal(s) include a flag value for a given unit of the video. the flag value indicates a selection between two options for the color spaces, the color sampling rates or the bit depths. or, the signal(s) include a syntax element for a given unit of the video. the syntax element indicates a selection between three or more options for the color spaces, the color sampling rates or the bit depths. a signal can be predictively coded, in which case a delta value for a parameter for a given unit of the video represents a difference between an actual value of the parameter and its predictor. the predictor can be a sequence layer parameter. or, the predictor can be based on one or more actual values of the parameter for one or more previous units of the video.[0015] in addition to the signal(s), the encoded data can include information identifying or defining the color spaces, color sampling rates and/or bit depths. for example, the information can include a matrix of values usable for color space transformation operations between two of the color spaces.[0016] the encoding or decoding can include prediction of sample values of a current block in a current picture based at least in part on a set of sample values of previously reconstructed content. for intra-picture prediction, the set of sample values of the previously reconstructed content is part of the current picture. for inter-picture prediction, the set of sample values of the previously reconstructed content is part of a reference picture. as part of the prediction, the encoder or decoder can evaluate whether the set of sample values of the previously reconstructed content and the sample values of the current block are in different formats.[0017] in some cases, the set of sample values of the previously reconstructed content are stored in a first format, and the sample values of the current block are encoded (Results 59)

Search 4 OR 3 (Results 162)

5:

Search 5 and (video w1 encoder or image w1 encoder) (Results 47)

6:

Search 6 and (color w1 space OR color w1 spaces) (Results 5)

7:

Title: VIDEO COMPRESSION WITH COLOR SPACE SCALABILITY

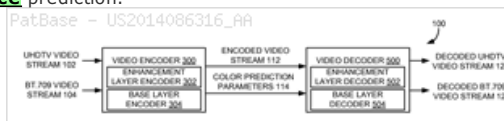
Abstract: Source: US2014086316A An image decoder includes a base layer to decode at least a portion of an encoded video stream into a first image having a first image format. The image decoder can generate a color space prediction by scaling a color space of the first image from the first image format into a color space corresponding to a second image format. The image decoder includes an enhancement layer to decode the encoded video stream to generate a second image in the second image format based, at least in part, on the color space prediction.

Classifications:

International (IPC 8-9): H04N11/04 H04N11/24 H04N19/186
H04N19/50 H04N19/70 H04N7/32 (Advanced/Invention);
H04N (Subclass/Invention)

CPC: H04N11/004 H04N11/006 H04N19/33 H04N19/186 H04N19/196
H04N19/463 H04N19/70 H04N19/132 H04N19/587 H04N19/80

US: 375/240.12 375/E7.243

**Family:**

Publication number	Publication date	Application number	Application date
CN104685878 A	20150603	CN201380049359	20130725
EP2898694 A1	20150729	EP20130839900	20130725
EP2898694 A4	20161221	EP20130839900	20130725
HK1212525 A1	20160610	HK20150111854	20151202
US2014086316 AA	20140327	US20120631558	20120928
US2014086318 AA	20140327	US20130034115	20130923
WO14045506 A1	20140327	WO2013JP04538	20130725

Priority:

US20120631558 20120928 US20120704776P 20120924 US20130034115 20130923
US20120739907P 20121220 US20130760634P 20130204 WO2013JP04538 20130725

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Inventor(s): SEUNG HWAN KIM ; KIRAN MUKESH MISRA ; LOUIS JOSEPH KEROFISKY

Agent(s): MUELLER BORE AND PARTNER PATENTANWALTE PARTG MBB; HARAKENZO WORLD PATENT AND TRADEMARK

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: ADAPTIVE SWITCHING OF **COLOR SPACES**, **COLOR** SAMPLING RATES AND/OR BIT DEPTHS

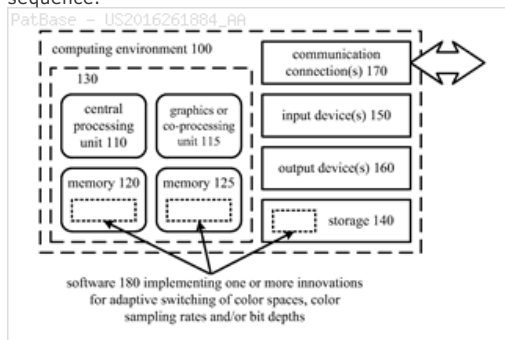
Abstract: Source: US2016261884A Innovations in adaptive encoding and decoding for units of a video sequence can improve coding efficiency. For example, some of the innovations relate to encoding/decoding that includes adaptive switching of **color spaces** between units within a video sequence. Other innovations relate encoding/decoding that includes adaptive switching of color sampling rates between units within a video sequence. Still other innovations relate encoding/decoding that includes adaptive switching of bit depths between units within a video sequence.

Classifications:

International (IPC 8-9): H04N19/117 H04N19/13 H04N19/132 H04N19/134 H04N19/136 H04N19/147 H04N19/172 H04N19/174 H04N19/176 H04N19/186 H04N19/27 H04N19/46 H04N19/587 H04N19/59 H04N19/61 H04N19/70 H04N19/82 H04N19/88 (Advanced/Invention)

CPC: H04N19/117 H04N19/132 H04N19/157 H04N19/587 H04N19/88 H04N19/13 H04N19/59 H04N19/176 H04N19/186 H04N19/134 H04N19/174 H04N19/82 H04N19/172 H04N19/61 H04N19/70

US: 375/240.02



Family:

Publication number	Publication date	Application number	Application date
AU2014385774 AA	20150911	AU20140385774	20140304
CA2939434 AA	20160811	CA20142939434	20140304
CL2016002184 A1	20170203	CL20160002184	20160831
CN105230023 A	20160106	CN201480029679	20140304
CO20160002211 A2	20161230	CO20160002211	20160922
EP3114843 A1	20170111	EP20140884978	20140304
EP3114843 A4	20170301	EP20140884978	20140304
IN201647028729 A	20160930	IN201647028729	20160823
JP2017512439 T2	20170518	JP20160555569T	20140304
KR20160129067 A	20161108	KR20167027275	20140304
MX2016011297 A1	20161108	MX20160011297	20140304
PH2016501641 A	20161003	PH20160501641	20160817
SG11201607282Y A1	20160929	SG20161107282	20140304
US2016261884 AA	20160908	US20140029242	20140304
WO15131328 A1	20150911	WO2014CN072847	20140304

Priority:

WO2014CN072847 20140304 WO2014CN72847 20140304

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: ENCODING STRATEGIES FOR ADAPTIVE SWITCHING OF **COLOR SPACES**, **COLOR** SAMPLING RATES AND/OR BIT DEPTHS

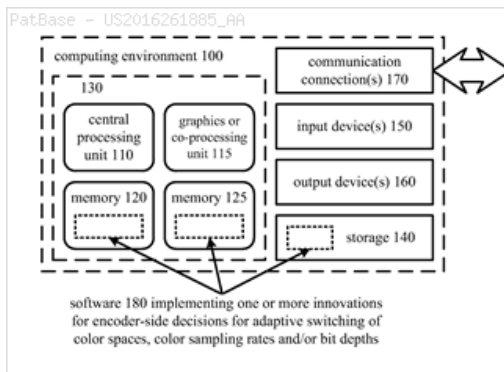
Abstract: Source: US2016261885A Innovations in adaptive encoding for units of a video sequence can improve coding efficiency. For example, some of the innovations relate to encoding that includes adaptive switching of **color spaces** between units within a video sequence. Other innovations relate encoding that includes adaptive switching of color sampling rates between units within a video sequence. Still other innovations relate encoding that includes adaptive switching of bit depths between units within a video sequence.

Classifications:

International (IPC 8-9): H04N19/00 H04N19/132 H04N19/147 H04N19/176 H04N19/182 H04N19/186 H04N19/51 H04N19/59 H04N19/593 (Advanced/Invention)

CPC: H04N19/117 H04N19/132 H04N19/147 H04N19/176 H04N19/186 H04N19/587 H04N19/182 H04N19/59 H04N19/51 H04N19/593

US: 375/240.02



Family:

Publication number	Publication date	Application number	Application date
CN105264888 A	20160120	CN201480031771	20140304
EP3114835 A1	20170111	EP20140885039	20140304
EP3114835 A4	20170301	EP20140885039	20140304
US2016261885 AA	20160908	US20140029243	20140304
WO15131330 A1	20150911	WO2014CN072852	20140304

Priority:

WO2014CN072852 20140304

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC

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Title: ADJUSTING QUANTIZATION/SCALING AND INVERSE QUANTIZATION/SCALING WHEN SWITCHING **COLOR SPACES**

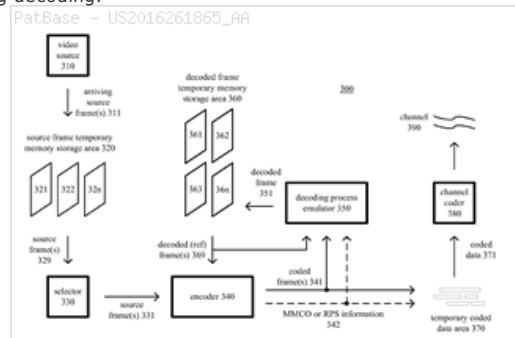
Abstract: Source: US2016261865A Innovations in adaptive encoding and decoding for units of a video sequence can improve coding efficiency when switching between **color spaces** during encoding and decoding. For example, some of the innovations relate to adjustment of quantization or scaling when an encoder switches **color spaces** between units within a video sequence during encoding. Other innovations relate to adjustment of inverse quantization or scaling when a decoder switches **color spaces** between units within a video sequence during decoding.

Classifications:

International (IPC 8-9): H04N19/124 H04N19/126 H04N19/136 H04N19/157 H04N19/172 H04N19/174 H04N19/176 H04N19/186 H04N19/70 H04N9/64 H04N9/67 (Advanced/Invention)

CPC: H04N19/136 H04N19/186 H04N19/176 H04N19/174 H04N19/124 H04N9/64 H04N19/172 H04N19/70

US: 375/240.03



Family:

Publication number	Publication date	Application number	Application date
AU2014388185 AA	20151001	AU20140388185	20140327
CA2940015 AA	20160817	CA20142940015	20140327
CN105432077 A	20160323	CN201480029700	20140327
CN105432077 B	20171229	CN201480029700	20140327
EP3123716 A1	20170201	EP20140886682	20140327
EP3123716 A4	20170329	EP20140886682	20140327
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JP2017513386 T2	20170525	JP20160559227T	20140327
KR20160138214 A	20161202	KR20167029796	20140327
MX2016012636 A1	20161214	MX20160012636	20140327
US2016261865 AA	20160908	US20140029223	20140327
WO15143671 A1	20151001	WO2014CN074197	20140327

Priority:

WO2014CN074197 20140327

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC

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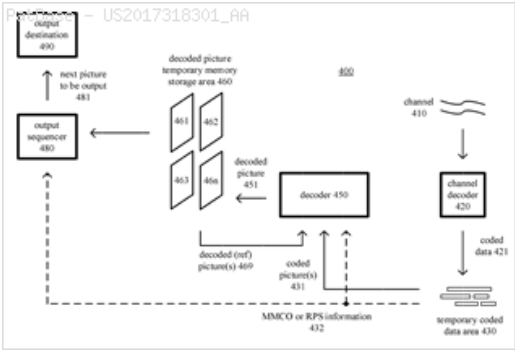
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Title: ADJUSTMENTS TO ENCODING AND DECODING WHEN SWITCHING COLOR SPACES

Abstract: Source: US2017318301A Innovations in encoding or decoding when switching color spaces are presented. For example, some of the innovations relate to signaling of control information for adaptive color space transformation ("ACT"). Other innovations relate to ACT operations. These innovations can improve coding efficiency when switching between color spaces during encoding and decoding.

Classifications:

International (IPC 8-9): H04N1/64 H04N11/04 H04N19/126 H04N19/176 H04N19/184 H04N19/186 H04N19/70 (Advanced/Invention) CPC: H04N19/184 H04N19/186 H04N1/644 H04N19/126 H04N19/176 H04N19/70



Family:

Publication number	Publication date	Application number	Application date
CN105960802 A	20160921	CN201480074010	20141008
CN105960802 B	20180206	CN201480074010	20141008
US2017318301 AA	20171102	US20140517931	20141008
WO16054765 A1	20160414	WO2014CN088119	20141008

Priority:

WO2014CN088119 20141008

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